

CLAIMS

1. A substrate, comprising:
a transparent base,
5 a transparent film in which a groove is formed to reach a main surface
of said transparent base, and
a wiring portion formed in said groove,
wherein said groove has a maximum width and a minimum width, and
said wiring portion in said groove has a width and a thickness determined by
10 correlation with the maximum width and the minimum width of said groove.
2. The substrate according to claim 1, wherein:
said transparent film is made of a transparent resin.
3. The substrate according to claim 1, wherein:
said transparent film is made of a photosensitive transparent resin.
- 15 4. The substrate according to claim 1, wherein:
said wiring portion is transparent or opaque.
5. The substrate according to claim 1, wherein:
said transparent film contains inorganic matter.
6. The substrate according to claim 1, wherein:
20 said transparent film is formed using a resin composition comprising an
alkali-soluble alicyclic olefin resin and a radiation-sensitive component.
7. The substrate according to claim 1, wherein:
a surface of said transparent film and a surface of said wiring portion
are substantially flush with each other.
- 25 8. The substrate according to claim 1, wherein:
when the maximum width and the minimum width of said groove in
transverse section are represented as W1 and W2, respectively, a maximum
wiring width Wi of said wiring portion in said groove has a relationship of

$W2 \leq W_i \leq W1$.

9. The substrate according to claim 8, wherein:

when a thickness of said wiring portion in said groove at the maximum wiring width W_i is represented as t_i , a thickness of said transparent film is represented as t_1 , and a thickness of said transparent film at a position of an average width $((W1+W2)/2)$ of said groove is represented as t_2 , the thickness t_i at a position of said maximum wiring width falls within the range of $t_2 \leq t_i \leq t_1$.

10. The substrate according to claim 1, wherein:

said transparent base is made of a glass or a plastic material.

11. A display device manufactured using said substrate according to claim 1.

12. The display device according to claim 11, wherein:

said display device is a liquid crystal display device or an EL display device.

13. A substrate manufacturing method, comprising the steps of:

forming a transparent resin film on a surface of a transparent base, selectively removing a surface of said transparent resin film to thereby form a groove reaching said transparent base, and

forming a wiring portion in said groove, said wiring portion reaching the surface of said transparent base,

wherein, in the step of forming said wiring portion, said wiring portion is formed so that a surface of said wiring portion and the surface of said transparent resin film become substantially flush with each other, thereby obtaining a substrate buried with said wiring portion.

14. The substrate manufacturing method according to claim 13, further comprising:

a pretreatment step of treating the surface of said transparent resin film before the step of forming said wiring portion,

wherein, in said pretreatment step, a wiring formation assistant layer is formed on the surface of said transparent resin film to prevent forming a material of said wiring portion on said wiring formation assistant layer, thereby assisting the formation of the material of said wiring portion in said groove.

5 15. The substrate manufacturing method according to claim 14, wherein:

 said pretreatment step includes the formation of said wiring formation assistant layer on the surface of said transparent resin film, and

 said wiring formation assistant layer is selected in relation to the step of
10 forming said wiring portion.

 16. The substrate manufacturing method according to claim 13, further comprising:

 a pretreatment step of forming, on a bottom surface of said groove, a wiring formation assistant layer that serves to assist adhesion of a material of
15 said wiring portion on the surface of said transparent base.

 17. The substrate manufacturing method according to claim 13, wherein:

 said transparent resin film is made of a photosensitive resin composition ,and

20 said photosensitive resin composition comprises a resin selected from the group consisting of an acrylic-based resin, a silicone-based resin, a fluorine-based resin, a polyimide-based resin, a polyolefin-based resin, an alicyclic olefin-based resin, and an epoxy-based resin.

 18. A substrate manufacturing method, comprising the steps of:
25 selectively providing a wiring formation assistant layer, which serves as a sacrifice layer, on a surface of a transparent base,

 forming a transparent resin film on an exposed surface of said transparent base and said wiring formation assistant layer,

forming a groove in said transparent resin film, and

forming a wiring portion in said groove,

wherein, in the step of forming said wiring portion, said wiring portion is formed so that a surface of said wiring portion and a surface of said
5 photosensitive transparent resin film become substantially flush with each other, thereby obtaining a substrate buried with said wiring portion.

19. The substrate manufacturing method according to claim 13, wherein:

the step of forming said wiring portion is a step of filling said groove with
10 a conductor, which forms said wiring portion.

20. The substrate manufacturing method according to claim 14, wherein:

said wiring formation assistant layer is any one of a lift-off layer, a catalyst layer, a water-repellent layer, and an electroless plating assistant layer.

15 21. A method of manufacturing a flat panel display device comprising the step of forming the substrate according to claim 13.